

REMARKS

Claims 1-4, 6-7, 11, 15, 18, 20-23, 25, 30, 34, 36, 38, and 41 are cancelled.

Claims 5, 8-10, 12-14, 16-17, 19, 24, 26-29, 31-33, 35, 37, 39-40 and 42-45 are pending.

Claims 24, 26-29 and 31 are allowed.

Claims 5, 8-10, 12-14, 16-17, 19, 32-33, 35, 37, 39, 40 and 42-45 are rejected.

The non-final office action dated 10 January 2010 indicates that base claims 16, 32 and 44 are rejected under 35 USC §103(a). Base claim 16 is rejected as being unpatentable over Armon U.S. Publication No. 2002/0114038 in view of Harres U.S. Patent No. 6,128,112 and Nakano U.S. Patent No. 6,795,675. Base claim 32 is rejected as being unpatentable over Armon in view of the '112 patent, Nakano, Saunders U.S. Patent No. 6,259,542 and Pulice U.S. Patent No. 5,270,533. Base claim 44 is rejected as being unpatentable over Armon in view of the '112 patent and Pulice.

Consider claim 44. The office action acknowledges that Armon does not describe the following feature:

a feedback loop for monitoring the electrical signal outputted by the photodiode, computing a ratio of noise energy for high and low signal in the monitored signal, and adjusting gain of the photodiode as a function of the ratio;

The '112 patent discloses a noise energy estimation to determine a logic level in an optical signal. The estimation includes computing a signal weighting factor as a function of the ratio of power of noise portion of a first phase segment to power of noise portion in a second phase segment in a signal (col. 3, lines 19-33). Using the weighting factor, relative power levels of the first and second phase segments are adjusted so as to attenuate the noise portion of the first segment (col. 6, lines 1-7 and 54-59; col. 9, lines 8-12; and col. 10, lines 60-62). This, in turn allows photodiode gain to be maintained at levels below which bulk dark current dominates (col. 6, lines 59-64; and col. 11, lines 10-17).

The '112 patent does not teach or suggest that the noise ratio can be used as an indicator or predictor of when photodiode breakdown is imminent due to temperature variations. The '112 patent does not teach or suggest adjusting the photodiode gain (M) when imminent breakdown is determined. Claim 44 has been amended to clearly recite this feature.

This feature was discussed during a telephonic interview between the undersigned and Examiner Li Liu on 13 May 2010. Examiner Liu agreed that the '112 patent is silent about using the noise ratio as an indicator of imminent photodiode breakdown due to temperature variations, and that amended claim 44 recites this feature. Examiner Liu indicated that he would update his search and discuss amended claim 44 with his supervisor. Examiner Liu is thanked for granting the interview and providing his comments during the interview.

Pulice is also silent about using a noise ratio to as an indicator of imminent breakdown due to temperature variations. Pulice uses current limiting to deal with avalanche photodiodes operating under extreme temperatures. Pulice describes a stabilization biasing circuit that includes a constant voltage source 10, constant current source 12, resistor 32 and DC free channel code 34 (col. 3, lines 37-42). The constant current source 12 is used as a bias for an avalanche photodiode 26 to limit the current in the photodiode 26 (col. 4, lines 17-30).

For the reasons above, the '103 rejection of base claim 44 and its dependent claims 5, 8-10, 12-14, 40 and 45 should be withdrawn

A similar amendment has been made to base claim 16. For the reasons above, the '103 rejection of base claim 16 and its dependent claims 17 and 19 should be withdrawn.

Method claim 46 is new. New claim 46 recites using a ratio of noise energy for high and low signal in a monitored signal as an indicator of imminent temperature-induced breakdown in a photodiode, and preventing breakdown of the photodiode by adjusting gain of the photodiode when the ratio indicates that temperature-induced breakdown is imminent. For the reasons above, new claim 46 and its dependent claims should be allowed over the documents made of record.

Former base claim 32 has been amended to depend from new base claim 46, and claims 33 and 35 have been cancelled. Therefore, the number of independent claims is unchanged, and the total number of claims has been reduced.

Claims 13 and 14 have been amended to depend properly from amended base claim 44. Claim 19 has been amended to depend properly from amended base claim 16. Claim 42 has been amended to depend properly from amended claim 32.

The Examiner is encouraged to contact the undersigned to resolve any outstanding issues prior to mailing another office action.

Respectfully submitted,

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